

**Section II: Non-AQMD LAER/BACT Determinations**  
**Application No.: 1-96-4371**  
**Equipment Category – I.C. Engine - Stationary, Non-Emergency**

<b>1. GENERAL INFORMATION</b>		DATE: 5/25/1999
A. MANUFACTURER: Waukesha		
B. TYPE: Lean-burn, low-NOx	C. MODEL: 12V-AT27GL	
D. STYLE: Spark-ignited		
E. APPLICABLE AQMD REGULATION XI RULES: N/A		
F. COST: \$ Equipment Cost (engine only): \$800,000 (1996)		SOURCE OF COST DATA:
Manufacturer		
G. OPERATING SCHEDULE:	24 HRS/DAY	7 DAYS/WK 52 WKS/YR
<b>2. EQUIPMENT INFORMATION</b>		APP. NO.: 1-96-4371
A. FUNCTION: The engine drives a pump that conveys liquid petroleum products.		
B. MAXIMUM HEAT INPUT:	C. MAXIMUM THROUGHPUT: 3130 BHP	
D. BURNER INFORMATION: NO.: TYPE:		
E. PRIMARY FUEL: Natural gas	F. OTHER FUEL: None	
G. OPERATING CONDITIONS: Variable load/speed		
<b>3. COMPANY INFORMATION</b>		APP. NO.: 1-96-4371
A. NAME: S. B. Linden, LLC		
B. ADDRESS: Linden pumping Facility, 2650 Marshes Dock Road		
CITY: Linden STATE: NJ ZIP:		
C. CONTACT PERSON: Donald Moore	D. PHONE NO.: (732) 748-9600	
<b>4. PERMIT INFORMATION</b>		APP. NO.: 1-96-4371
A. AGENCY: New Jersey Department of Environmental Protection		
B. AGENCY CONTACT PERSON: Bureau of Air Quality Engineering	C. PHONE NO.: (609) 633-1110	
D. PERMIT TO CONSTRUCT INFORMATION: P/C NO.: 01-96-4371 ISSUANCE DATE: 12/13/1996		
E. START-UP DATE: 4/1/96		
F. PERMIT TO OPERATE INFORMATION: P/O NO.: Pending ISSUANCE DATE:		
<b>5. EMISSION INFORMATION</b>		APP. NO.: 1-96-4371
<b>A. PERMIT</b>		
A1. PERMIT LIMIT:		
NOx = 1.89 lbs/hr and 50 ppm		
CO = 1.75 lbs/hr and 76 ppm		
TSP = 0.31 lb/hr*		
SO2 = 0.16 lb/hr		
ROG = 0.76 lb/hr and 58 ppm*		

NH<sub>3</sub> = 0.331 lb/hr and 10 ppmvd @ 15% O<sub>2</sub>  
 where,  
 lb/hr = pounds per hour based on any 60 consecutive minute period; and  
 ppm = parts per million by volume, dry basis, 1-hour average, corrected to 7% oxygen  
 (except for ammonia).  
 Also, the controlled emissions from the engine shall not exceed the above concentration limits except during periods of startup and shutdown (lb/hr limits apply at all times).  
 \* Based on test methods not consistent with AQMD methods.

A2. BACT/LAER DETERMINATION: Not subject to LAER.

## B. CONTROL TECHNOLOGY

B1. MANUFACTURER/SUPPLIER:

Siemens Westinghouse  
 1007 Mansell Road  
 Roswell, GA 30076  
 (707) 552-8527

B2. TYPE: Siemens, SINOx, SCR and oxidation catalyst system.

B3. DESCRIPTION:

The add-on air pollution control equipment consists of a reactor housing with two catalyst beds.  
 The first bed contains a proprietary SCR catalyst for NO<sub>x</sub> and the second bed contains an oxidation catalyst for CO and hydrocarbons. The subject equipment uses a feed forward/predictive emission monitoring system to provide emissions control during rapid load change periods. The system is programmed with NO<sub>x</sub> vs. engine load data during startup and the computer uses this information to determine the right quantity of ammonia to inject into the catalyst bed. In addition, the catalyst bed has a "sponge effect" feature that minimizes NO<sub>x</sub> and ammonia spikes by absorbing these spikes during load changes followed by gradual desorption thereafter. Key parameters that affect the efficiency of the SCR/oxidation catalyst system include the following: operating temperature (the permit requires > 500 degrees Fahrenheit), ammonia flow rate to the SCR (the permit requires < 0.7 gallons/hour), residence time, engine air/fuel ratio (for this application, the air/fuel ratio should be 32:1 at peak load), and back pressure.

B4. CONTROL EQUIPMENT PERMIT APPLICATION DATA: P/C NO.: Same as basic equipment ISSUANCE DATE:  
 P/O NO.: Pending ISSUANCE DATE:

B5. WASTE AIR FLOW TO CONTROL EQUIPMENT:

FLOW RATE:

ACTUAL CONTAMINANT LOADING:

BLOWER HP: HP

B6. WARRANTY: Equipment and components - 1 year; Process requirements - 3 years

B7. PRIMARY POLLUTANTS:

The control equipment is used to reduce NO<sub>x</sub>, CO, and ROG emissions from the engine.

B8. SECONDARY POLLUTANTS:

There is a small quantity of ammonia emitted from the air pollution control equipment (i.e., ammonia slip). Permit conditions limit the ammonia emissions to not more than 0.331

lb/hr and 10 ppm.
<p>B9. SPACE REQUIREMENT:</p> <p>The subject control equipment (including ancillary equipment) requires approximately 100 square feet of floor space with an additional 90 square feet of floor space required for the ammonia storage tank. The size of the control equipment is directly related to the exhaust gas flowrate.</p>
<p>B10. LIMITATIONS:</p> <p>The exhaust gas temperature should be maintained between 340-850 degrees Fahrenheit in order to ensure complete reaction of ammonia and NOx. Also, the SCR has been demonstrated with liquid and solid fuels, but not with digester gas or landfill gas.</p>
<p>B11. LOCATION OF PRIOR DEMONSTRATION &amp; AGENCY:</p> <p>FACILITY:</p> <p>CONTACT PERSON: PHONE NO.:</p> <p>AGENCY: SCAQMD</p> <p>ADDRESS:</p> <p>CONTACT PERSON: PHONE NO.:</p>
<p>B12. OPERATING HISTORY:</p> <p>The subject equipment has been in continuous operation since April 1996. During this period the engine typically operated at 80-95% capacity.</p>
<p>B13. SOURCE TEST/PERFORMANCE DATA ANALYSIS:</p> <p>DATE OF SOURCE TEST: March 1997 CAPTURE EFFICIENCY:</p> <p>DESTRUCTION EFFICIENCY: OVERALL EFFICIENCY:</p> <p>PERFORMANCE DATA:</p> <p>The subject engine was source tested by Air Nova, Inc. in January and March 1997. The source test reports have been analyzed by the New Jersey Department of Environmental Protection (Bureau of Technical Services) and compliance with permit limits has been demonstrated. In addition to the local permitting authority, the District's Source Testing &amp; Engineering Section has also evaluated the complete source test report. The following data (corrected to District standards) provides the results from the March 1997 tests.</p> <p>Emissions Data (four 1-hour tests):</p> <p>NOx = 16.5, 13.9, 14.0, 15.6</p> <p>CO = 26.5, 25.8, 25.1, 24.8</p> <p>NH3 = &lt;0.1, &lt;0.1, &lt;0.2, &lt;0.1</p> <p>Load = 98%, 98%, 96%, 97%</p> <p>NOx, CO, and NH3 are reported as ppm @ 15% O2, dry, 1-hour average</p> <p>VOC emissions information is not included because the source test method used is not consistent with AQMD methods.</p>
<p>B14. SOURCE TEST CONDITIONS/PERFORMANCE DATA:</p> <p>Stack Emission Testing Requirements:</p> <p>(1) Three 1-hour tests in accordance with N.J.A.C. 7:27-8.4(c) for NOx, CO, VOC, and ammonia.</p> <p>(2) Source tests shall be conducted within plus or minus 5% of full load.</p> <p>The manufacturer of the air pollution control equipment designed the system to meet the permit limits during all operating conditions except startup and shutdown.</p>

## C. COST

C1. CONTROL EQUIPMENT COST: ☐ CHECK IF INSTALLATION COST IS INCLUDED IN CAPITAL COST  
CAPITAL: \$250,000 INSTALLATION: \$ (1996) SOURCE OF COST DATA: Owner/Operator

C2. ANNUAL OPERATIONAL/MAINTENANCE COST: \$25,000 (1996) SOURCE OF COST DATA:

## D. DEMONSTRATION OF COMPLIANCE

D1. STAFF PERFORMING FIELD EVALUATION:

ENGINEER'S NAME:

INSPECTOR'S NAME:

DATE: 12/17/97

D2. COMPLIANCE DEMONSTRATION: Compliance with permit conditions was verified.

D3. VARIANCE: NO. OF VARIANCES: DATES:

CAUSES:

D4. VIOLATION: NO. OF VIOLATIONS: None since the January 1997 violation. DATES:

CAUSES: See 6 (Comments).

D5. FREQUENCY OF MAINTENANCE: Regular catalyst maintenance is required.

## 6. COMMENTS

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In January 1997 a NOV was issued because the engine exceeded the concentration and mass emission rate limits for VOC. The catalyst array (which had been coated with lubricating oil during startup and break-in) was then cleaned and checked and the engine was retested in March 1997. A review of the March source test indicated compliance with VOC emission limits. For this type of control equipment, regular catalyst maintenance is necessary to ensure high efficiency operation.

The maximum uncontrolled NO<sub>x</sub>, CO, and VOC emissions from the subject engine are as follows:

NO<sub>x</sub> = 5.51 lbs/hr (0.8 gram/BHP-hr)

CO = 12.42 lbs/hr (1.8 grams/BHP-hr)

VOC = 6.90 lbs/hr (1.0 gram/BHP-hr)